

Claims

1. A joining construction for mounting CCD cells of a color line camera in an aligned fashion on a color splitting prism, which is attached to a prism housing, said joining construction comprising: fastening elements having a length substantially larger than the length of the CCD cell and extending from a housing margin on one side of a light exit surface of said color splitting prism to another housing margin on the opposite side of said light exit surface; a first glue joint between the CCD cell and its fastening element; and third glue joints said fastening element and said margins of the housing.
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- 10 2. A joining construction of claim 1, comprising for each CCD cell:
– heat distribution piece(s), that extend(s):
 - along the opposite sides of the housing and along the ends of said fastening element, or
 - along the back side of the fastening element, whereupon
15 each fastening element is further attached to said heat distribution pieces by second glue joints; or alternatively
– extensions of the fastening element, which extensions extend along the opposite sides of the housing.
- 20 3. A joining construction of claim 2, further comprising one or several Peltier elements, which is/are in surface contact with the heat distribution pieces in order to reduce the temperature differences between the joining construction components and the prism.
- 25 4. A joining construction of claim 1, wherein the first glue joint is a thermally conductive glue with a heat transfer coefficient that is at least 0.6 W/m·K.
5. A joining construction of claim 2, wherein the second glue joints are a thermally conductive glue with a heat transfer coefficient that is at least 0.6 W/m·K.
- 30 6. A joining construction of claim 1, wherein each fastening element includes front surfaces that are substantially parallel to the photosensitive surface of the CCD cell; at each exit surface said two housing margins are essentially parallel to said exit surface of the color splitting prism; and said front surfaces are supported against said housing margins.

7. A joining construction of claim 2, wherein the heat distribution pieces or the fastening element extensions are attached by heat-insulating elements to the prism housing.
8. A joining construction of claim 7, wherein said elements are a fourth glue joint
5 and/or a combination of an insulating layer and screws.
9. A joining construction of claim 1, wherein the third glue joints are thermally insulating glue or cast plastic, with a heat transfer coefficient that is no more than 0.3 W/m·K.
10. A joining construction of claim 8, wherein the fourth glue joints are thermally insulating glue or cast plastic, with a heat transfer coefficient that is no more than 0.3 W/m·K.
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11. A joining construction of claim 1 or 2, wherein the material of the fastening element and the heat distribution pieces is metal, and that said metal is copper or aluminum or an alloy of either of these.
- 15 12. A joining construction of claim 6, wherein in cross-section the fastening element of the CCD cell has the shape of a right-angled J-profile that opens towards the prism, at the center of which profile the CCD cell is attached, and the end branches of said profile form said front surfaces.
13. A joining construction of claim 12, wherein the single areas of said front surfaces constitute no more than 20% or no more than 10% of the smooth area of the active side of the CCD cell, in order to obtain a small heat transfer surface.
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14. A joining construction of claim 3, further comprising a temperature sensor attached to the CCD cell in order to maintain its temperature at a predetermined value; whereupon in cold conditions, the polarity of the Peltier elements is arranged to heat the CCD cell, and in warm conditions, the polarity of the Peltier element is arranged cool the CCD cell.
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15. A joining construction of claim 1, wherein the material of the housing is metal or glass or ceramics.
16. A method for mounting CCD cells of a color line camera on a color splitting prism, which is in advance attached to a housing, the method of mounting each of the CCD cells onto said prism comprising the steps of:
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- creating a thermally conductive surface contact between the CCD cell and a fastening element that is essentially larger than the CCD cell by joining them together with a first glue;
- 5 - aligning the fastening element with the attached CCD cell at the correct position on said prism exit surface; and
- gluing the fastening element, while maintaining the obtained alignment of the CCD cell, at least at two front surfaces located in the area of its outer margins and having areas substantially smaller than the area of the CCD cell, with a third glue to the prism housing.
- 10 17. A method of claim 16, further comprising the steps of:
- creating a thermally conductive surface contact between heat distribution pieces and the ends of the fastening element by joining them together with a second glue; and
- 15 - attaching the heat distribution pieces to the prism housing in a heat-insulating fashion and in order to make the structure rigid.
18. A method of claim 16, further comprising the steps of:
- creating a thermally conductive surface contact between heat distribution pieces and the back side of the fastening element by joining them together with a second glue; and
- 20 - attaching the heat distribution pieces to the prism housing in a heat-insulating fashion and in order to make the structure rigid.
19. A method of claim 16, further comprising the step of fastening the extensions of the fastening element to the prism housing in a heat-insulating fashion and in order to make the structure rigid.
- 25 20. A method of claim 16, wherein it further comprises a step of attaching one or several Peltier elements against fastening element extensions.
21. A method of claim 17, wherein it further comprises a step of attaching one or several Peltier elements against the heat distribution pieces.
- 30 22. A method of claim 16, wherein the first glue is allowed to harden prior to said alignment.
23. A method of claim 17 or 18, wherein the third glue is allowed to harden prior to the fastening of the heat distribution pieces with the second glue.

24. A method of claim 16, wherein heat distribution pieces and fastening element extensions are attached to the prism housing:
- with a fourth thermally insulating glue; or
 - by arranging an insulation between the heat distribution pieces and the prism housing, and by fastening the heat distribution pieces to the housing by mechanical fastening elements.
- 5 25 A method of claim 16, wherein the employed first glue is a thermally conductive glue, with a heat transfer coefficient of at least 0.6 W/m·K.
- 10 26. A method of claim 16, wherein the employed third glue is a thermally insulating glues or cast plastics with a heat transfer coefficient of no more than 0.3 W/m·K.
- 15 27. A method of claim 17 or 18, wherein the employed second glue are thermally conductive glues, with a heat transfer coefficient of at least 0.6 W/m·K.
- 22 28. A method of claim 24, wherein the employed fourth glue are thermally insulating glues or cast plastics with a heat transfer coefficient of no more than 0.3 W/m·K.

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